# Face detection based attendance system

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*Abstract*—The ID card attendance system used in schools in Bangladesh today requires deep learning and neural network techniques more than ever before. The aim of the study is to demonstrate that the Haar wavelet neural network (HWNN) that uses the Harr wavelet as an active function with the help of deep learning can be used in school attendance systems as a facial recognition attendance system. The result shows that the student's face needs to be identified, and then the face needs to be used as an attendance. The purpose of this research is to examine and critically evaluate recent attendance marking techniques using facial recognition methods. The literature review shows that the intelligent implementation of facial recognition techniques can make attendance management systems more effective. In this paper, through facial recognition, we suggest an ideal model for an automated attendance system.

*Index Terms*—component, formatting, style, styling, insert

## I. INTRODUCTION

These days, the ID card punching system is used for class attendance system. One of the major problems of an ID-cardbased attendance system is that a student can provide the attendance of another student with the help of an ID-card. Even though the other student may not be present in a particular class, his attendance will be given and everyone will think that he was present on that particular day in his class. It will be very difficult to solve this issue because the teacher in a class has to memorize the face of everybody and maintain track of who gives the correct attendance which is really time consuming and sometimes impossible because the teacher has to teach in the class. These days, this fraud is going on so much. This is why we offer you facial recognition attendance system that will fix this kind of fraud and make no mistakes because the images of the faces of the students will be saved as well as their attendance so if any student tries to offer the attendance of another student, he/she will be caught. Some advantages of this system are: Firstly, the security level will improve as a face biometric system improves your security measures. Secondly, it is an easy integration process as facial recognition tools work pretty flawlessly. Thirdly, the accuracy rate is really high because the success level of face tracking technology these days

became higher than ever before. Fourthly, it has the advantage of full automation instead of manual recognition. Fifthly, you need to forget the time fraud. No more buddy favors, since everyone now has to pass a face scanning devices to check-in. Sixthly, facial recognition attendance system can accurately track time and attendance without human error. Seventhly, removes the risk of manual errors. Eightly, it saves time by instantly eliminating the hassle of swiping cards or waving badges around. Ninthly, facial recognition attendance system can moreover hold data that allows the school to study and keep an eye on their students' statistics and any added reports which are required.

## II. LITERATURE REVIEW

A number of techniques for face detection were suggested, i.e. AdaBoost algorithm, FloatBoost algorithm, Support Vector Machines (SVM), Viola Jones detection algorithm and Bayes classification. With the quick face detection algorithm, the effectiveness of the face recognition algorithm can be improved. Some of the previous face recognition methods were appearance-based methods that use texture characteristics applied to the whole face. Some of the other techniques for prior face recognition were feature-based that utilizes geometric features such as mouth, nose, eyes, eye brows, cheeks, and their relationship. After the implementation of the historical igenface method, the research of facial recognition became popular in the early 1990s. In 2014, DeepFace accomplished state-of-the-art precision on the renowned LFW benchmark, for the first time approaching human output on unconstrained situation, by training a 9 layer system on 4 million facial pictures. Inspired by this job, the focus of studies has moved to deep-learning methods, and in just three years the precision has dramatically increased. Deep learning has transformed facial recognition's study landscape into almost all elements such as algorithm models, training/test information sets, implementation scenarios and even assessment protocols. Our research indicates that the attendance can be registered more effectively by applying the real-time face recognition attendance system. The suggested system will automatically update the attendance. It provides us the precise outcome.

## III. SYSTEM DESCRIPTION

The internal algorithm of the system calculates all part of the face taking a certain period of time. The system then stores information on a folder. The system then gets trained with the images of these faces. The system can then recognize the faces and is used as an attendance system. Teacher can change or update database and customize the system. So the user section of our suggested system can be divided into two parts: Teacher and student. 1. Teacher: Teacher may update the database by removing an attendance or adding a fresh attendance. Teacher can use the facial recognition attendance system as they like. They can use it to detect faces, train the system, recognize faces, and give attendance. 2. Student: Student can only use the system if the teacher wants some information to be provided by the student.

### A. Facial detection

This option allows facial recognition attendance system to detect faces. Basic step is that the studnet has to come before the camera. Once he has come before the camera, facial recognition attendance system will detect his face taking some time and save different pictures of his face in a folder.

### B. Train

This option will allow the facial recognition attendance system to train itself with the information of the detected faces.

### C. Facial recognition

This option will allow the facial recognition attendance system to recognize faces. Basic step is that the student has to come before the camera. Once he has come before the camera, facial recognition attendance system will recognize the face.

### D. Give attendance

This option will allow facial recognition attendance system to give attendance. Basic step is the student has to come before the camera. Once he has come before the camera, facial recognition attendance system will recognize the face and give the attendance.

### E. Student requirements

The students will be able to keep track of their attendance. This would require them to log into the system. They can sign into the system if his/her ID and password are the same as those stored in the database and from there they will be able to see their attendance record.
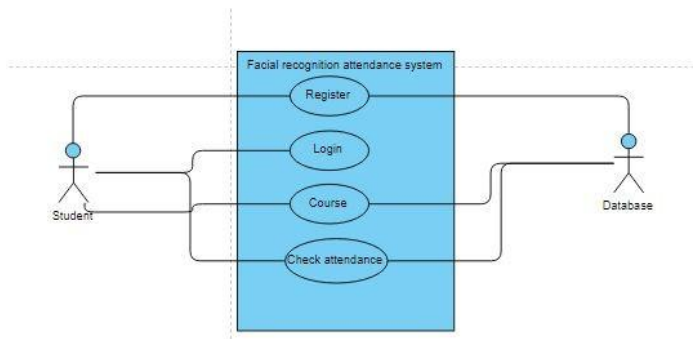


Fig. 1. System use case diagram for student

### F. Teacher requirements

Teachers need an effective way to record students' attendance during classes. Teachers will be able to log into the system using their ID number and password. They're going to be able to see all their classes and the list of students in the classes. He/she will also be able to see all of his/her previous classes and class attendance records.
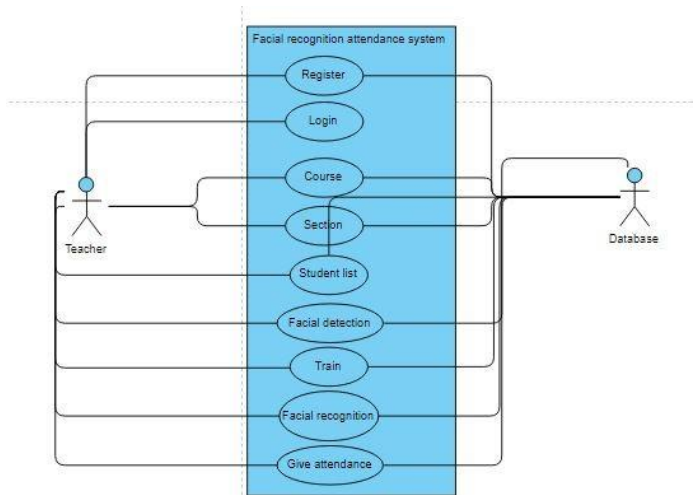


Fig. 2. System use case diagram for teacher

## IV. HARDWARE AND SOFTWARE SPECIFICATION

### A. Hardware specification

A processor with at least four logical cores (Intel Core i5 series recommended) as server ,8 GB DDR4 RAM , 400 GB of free hard disk space ,22 inch or higher dimensions HD monitor ,webcam / camera.

*B. Software specification*

1) *Software and libraries:* Python , OpenCV ,PHP

,NumPy,SQLiteStudio ,Tkinter ,Shutil ,CSV ,pandas ,datetime ,time ,Python sys ,OS ,Python Imaging Library.

2) *Design Frameworks:* XML ,HTML ,CSS ,JS.

3) *Haarcascades:* eye.xml and frontalfacedefault.xml.

Fig. 3. Facial detection using OpenCV



Fig. 4. Some images of a student.

*B. Algorithms*

1) *Detect face:* Fig. 5. shows how we can draw a rectangle around a face. The input is the image shown by the webcam/camera. (x, y) is the starting point and (x+w,y+h) is the end point. (0,0,255) is a rectangle color. 2 is the thickness of the rectangle.

```
for (x, y, w, h) in faces_rect:
    cv2.rectangle(image_copy, (x, y), (x+w, y+h), (0, 255, 0), 15)
```

Fig. 5. Algorithm for drawing rectangle around face

## V.     DATA AND TECHNIQUES

### A.     Data collection

Data are collected from students taking part in two different classes. We used OpenCV's facial detection technique to detect the faces of students. Fig. 3. shows how OpenCV's facial detection works. By applying our algorithm, we collected 30 images of each student. Fig. 4. shows some images of a student to be trained. We used Python and PHP for implementing the



## VI.     RESULTS AND ANALYSIS

The proposed system was tested for a total of 70 students in two classes. It was able to recognize every student and give attendance. It didn't take a lot of time to detect faces, get trained, recognize faces, and give attendance. For comparison, we decided to take a different number of images of a student, and we found that taking 30 images of a student gives a good chance to recognize that student accurately. We used deep learning algorithms in OpenCV. Multiple faces could also be detected in a video/photo. The system requires very little time system.

## VII. CONCLUSION

The goal of the project: Develop an attendance system that helps to monitor the attendance for students in schools via a computerized system where the images of their faces will be recognized and their attendance will be given. The IDcard-based attendance takes a lot of time. Our system helps a lot to save time. Our outcome is that our technique was able to recognize the students accurately and provide their attendance. It also store past attendance records and shows current attendance records. This research has successfully shown that the implementation of the Haar wavelet neural network and deep learning can be used as a facial recognition attendance system. Facial recognition attendance system is also a vital tool for other fields. However, the quality of the camera is also a key factor. Good camera is going to give better student images. One problem is that someone else can see another student's name or ID so it can play a role in violating privacy. It's going to be really safe, because it's going to store the time of your attendance and your photo. The system is created to deploy a simple and safe way to give attendance. Having an automated attendance system helps in keeping the accurate and reliable data. It can be used for security purposes as well.

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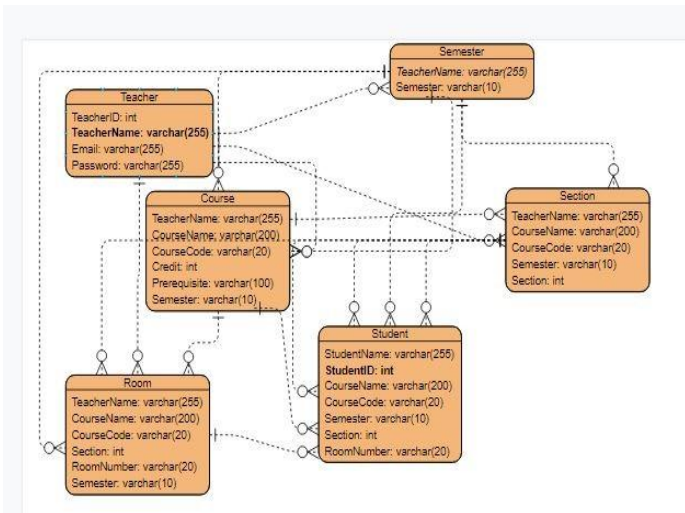
Fig.6.  Database ER diagram.

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